

TEMPERATURE SWITCH

Swiss based Trafag is a leading international supplier of high quality sensors and monitoring instruments for measurement of pressure and temperature.



Applications

- Machine tools
- Hydraulic power units
- Cooling and lubrication systems
- HVAC
- Process technology

Features

- Parameterization also via NFC-smartphone App (Android)
- Display and electrical connection are independently rotatable 335°/343°
- Analogue output switchable mA or V
- Integrated datalogger
- Temperature measuring range adjustable, 50 ... 100 % of the nominal range

05/2022

Data sheet H72352e

Technical Data

| | | | |
|---------------------|---|------------------------------|--|
| Measuring principle | PT 1000, DIN EN 60751 class A, 2 conductors | Accuracy @ 25°C typ. | ± 0.5 % FS typ. + temperature sensor error |
| Measuring range | -50°C ... +150°C / -58°F ... 302°F adjustable 50 ... 100 % FS | Ambient temperature | -25°C ... +85°C |
| Output signal | 4 ... 20 mA, 0 ... 5 VDC, 1 ... 6 VDC, 0 ... 10 VDC, switchable mA or V | Temperature unit for display | °C, °F, K, user scale |
| Switching output | 2 PNP | Logger | Ring buffer: 3518 data points Sampling time: 0.1 ... 999.9 s, Off (0) |

Subject to change

Ordering information/type code

| | | 8180 . XX | XX | XX | XX | XX | XX |
|---|--|-----------|----|----|----|----|----|
| Operating temperature media | Measuring range | | | | | | |
| | -50°C ... +150°C (-58°F ... 302°F) | 50 | | | | | |
| Sensor | Sensor DIN EN 60751, class 1, wetted parts 1.4404 (AISI316L) | | 21 | | | | |
| | Sensor DIN EN 60751, class 1, wetted parts 1.4404 (AISI316L), shorter response time ¹⁾ | | 22 | | | | |
| Process connections | See table below "Ordering no. for process connections" | | | | | | |
| Electrical connection | Male electrical plug M12x1, 4-pole, Mat. PA (Accessories P3, P4) | | | | | 32 | |
| | Male electrical plug M12x1, 5-pole, Mat. PA (Accessories P1, P2) | | | | | 35 | |
| Output signal | Switching output PNP, current output 4 ... 20 mA, switchable to 0 ... 10 VDC; output detail see accessories P1, P2, P3 | | | | | | PA |
| | Switching output PNP, voltage output 1 ... 6 VDC; output detail see accessories P1, P2, P3 | | | | | | PU |
| | Switching output PNP, voltage output 0 ... 10 VDC; output detail see accessories P1, P2, P3 | | | | | | PV |
| | Switching output PNP, voltage output 0 ... 5 VDC; output detail see accessories P1, P2, P3 | | | | | | PW |
| | Switching output PNP; output detail see accessory P4 | | | | | | PS |
| Accessories | Pin configuration 5-pole.; 1: U+, 2: analogue, 3: U-, 4: SP1, 5: SP2 | | | | | | P1 |
| | Pin configuration 5-pole.; 1: U+, 2: SP2, 3: U-, 4: SP1, 5: analogue | | | | | | P2 |
| | Pin configuration 4-pole.; 1: U+, 2: analogue, 3: U-, 4: SP1 | | | | | | P3 |
| | Pin configuration 4-pole.; 1: U+, 2: SP2, 3: U-, 4: SP1 | | | | | | P4 |
| | Female electrical plug M12x1, 5-pole | | | | | | 33 |
| | Parametrisation standard (see table Parameter) | | | | | | ZS |
| | Parametrisation according to customer specifications (see table Parameter) | | | | | | ZC |
| | Function package 1: Temperature offset correction / Measuring range zero point adjustment (included as basic function) | | | | | | Z1 |
| | Function package 2: User scale unit / analogue output adjustment | | | | | | Z2 |
| Protective cap, 1 pc. F89051, package of 5 pcs. F89052, package of 25 pcs. F89075 | | | | | | | |

¹⁾ Upon request

Ordering no. for process connections

| Sensor length | 50 mm | 100 mm | 150 mm | 200 mm * | 250 mm * | 300 mm * | 400 mm * |
|------------------------------------|-------|--------|--------|----------|----------|----------|----------|
| G1/8" male | 11 | 21 | 31 | 41 | 51 | | |
| G1/4" male | 12 | 22 | 32 | 42 | 52 | | |
| G1/2" male | 13 | 23 | 33 | 43 | 53 | | |
| G1/8" male, compression fitting | 14 | 24 | 34 | 44 | 54 | | |
| G1/4" male, compression fitting | 15 | 25 | 35 | 45 | 55 | | |
| G1/2" male, compression fitting | 16 | 26 | 36 | 46 | 56 | 66 | 86 |
| M20 x 1.5 mm, compression fitting | * | * | * | * | 57 | | |
| 1/4" NPT male | 1B | 2B | 3B | 4B | 5B | | |
| 1/2" NPT male | 1C | 2C | 3C | 4C | 5C | | |
| 1/4" NPT male, compression fitting | 1D | 2D | 3D | 4D | 5D | | |
| 1/2" NPT male, compression fitting | 1E | 2E | 3E | 4E | 5E | | |
| Tri-Clamp DIN 32676, DN25/DN40 * | 1G | 2G | 3G | 4G | 5G | | |
| Tri-Clamp DIN 32676, DN50 * | 1J | 2J | 3J | 4J | 5J | | |
| Sanitary fitting DIN 11851, DN25 * | 1L | 2L | 3L | 4L | 5L | | |
| Sanitary fitting DIN 11851, DN40 * | 1M | 2M | 3M | 4M | 5M | | |
| Sanitary fitting DIN 11851, DN50 * | 1N | 2N | 3N | 4N | 5N | | |

* Upon request

| Parameters | | | | |
|--|---------------------------------|--|------------|------------------------------------|
| Name | Standard setting (accessory ZS) | Value range | Short name | Customer adjustment (accessory ZC) |
| Switch point SP1 (hysteresis mode) Upper switch point FH1 (window mode) | 75 % Measuring range | SP1 > RP1 FH1 > FL1 Hysteresis $\geq 1\%$ FS | SP1 | |
| Reset point RP1 (hysteresis mode) Lower switch point FL1 (window mode) | 25 % Measuring range | RP1 < SP1 FL1 < FH1 Hysteresis $\geq 1\%$ FS | RP1 | |
| Switch point SP2 (hysteresis mode) Upper switch point FH2 (window mode) | 75 % Measuring range | SP2 > RP2 FH2 > FL2 Hysteresis $\geq 1\%$ FS | SP2 | |
| Reset point RP2 (hysteresis mode) Lower switch point FL2 (window mode) | 25 % Measuring range | RP2 < SP2 FL2 < FH2 Hysteresis $\geq 1\%$ FS | RP2 | |
| Switch point delay time SP1 (hysteresis mode) Switch point delay time FH1 (window mode) | 0 | 0 ... 99.99 s | dS1 | |
| Switch point delay time RP1 (hysteresis mode) Switch point delay time FL1 (window mode) | 0 | 0 ... 99.99 s | dR1 | |
| Switch point delay time SP2 (hysteresis mode) Switch point delay time FH2 (window mode) | 0 | 0 ... 99.99 s | dS2 | |
| Switch point delay time RP2 (hysteresis mode) Switch point delay time FL2 (window mode) | 0 | 0 ... 99.99 s | dR2 | |
| Functions switching output 1 | Hysteresis, closer (Hno) | Hysteresis NO (Hno), Hysteresis NC (Hnc) Window NO (Fno), Window NC (Fnc) | ou1 | |
| Functions switching output 2 | Hysteresis, closer (Hno) | Hysteresis NO (Hno), Hysteresis NC (Hnc) Window NO (Fno), Window NC (Fnc) | ou2 | |
| Temperature units | °C | °C, °F, K | uni | |
| Measuring range adjustment | 100 % Nominal temperature | 50 ... 100 % Nominal | T_EP | |
| Damping (analogue output) | 0.01 s | 0.01 ... 3.00 s (time constant) | dAA | |
| Display rotation | No | no, yes (180°) | disr | |
| Display mode | Current measuring value | Measuring value: current, highest, lowest, display off Current value: decimal places selectable (max. 3) | dis | |
| Display actualisation | 2 | 1, 2, 5, 20 Hz | duTd | |

| Specifications | | |
|---------------------------------|--|---|
| Electrical Data | Output / supply voltage | 4 ... 20 mA: 24 (15 ... 30) VDC 0 ... 5 VDC: 24 (15 ... 30) VDC 1 ... 6 VDC: 24 (15 ... 30) VDC 0 ... 10 VDC: 24 (15 ... 30) VDC |
| | Power-on delay time | Typ. 200 ms |
| | Inverse-polarity protection, short-circuit strength @ 25°C during 5 min. | integrated |
| | Current consumption / power consumption | ≤ 30 mA |
| Environmental conditions | Ambient temperature | -25°C ... +85°C |
| | Protection ¹⁾ | IP67 |
| | Humidity | Max. 95 % relative |
| | Vibration | 10 g (10 ... 2000 Hz) for sensor length ≤ 150 mm |
| | Shock | 50 g / 3 ms |
| EMC Protection | Emission | EN/IEC 61000-6-3 |
| | Immunity | EN/IEC 61000-6-2 |
| Mechanical Data | Sensor (wetted parts) | 1.4404/1.4435 (AISI316L) |
| | Housing | Steel, die cast metal galvanised display housing plastic |
| | Sealing | FPM, EPDM |
| | Male electrical connector | See ordering information |
| | Weight | ~ 189 g, depending on process connector |
| | Mounting torque | 20 Nm |
| | Housing alignment | Display 335° rotatable, max. 2.5 Nm Electrical connection 343° rotatable, max. 5 Nm |

¹⁾ See electrical connection

| Accuracy | |
|--------------------------|---|
| Analogue output | ± 0.5 % FS typ. + Temperature sensor error |
| Switch point | ± 0.3 % FS typ. + Temperature sensor error |
| Display | ± 0.3 % FS typ. + Temperature sensor error + 1 digit |
| Temperature sensor error | For °C: ± (0.15 K + 0.002 t) according to EN 60751 For °F: ± [1.8*(0.15 + 0.002 (t - 32) / 1.8)] |
| Time constant | T ₆₀ = 12.5 s, in air T ₉₀ = 33 s, in air |

| Analogue output | |
|---|---|
| Output signal | Switchable 4 ... 20 mA or voltage |
| Current limiting output signal | 4 ... 20 mA: 25 mA (overload) |
| | 0 ... 10 VDC: < 40 mA (short-circuit) |
| Damping (rise time) | 0.01 ... 3.00 s / 10 ... 90 % Nominal temperature |
| Offset correction of analogue output and display indication | ± 5°C |
| Measuring range zero point adjustment (T_nP) | 0 ... 50 % FS ²⁾ |
| Measuring range end point adjustment (T_EP) | 50 ... 100 % FS ²⁾ |
| Zero point adjustment analogue output (o_nP) ¹⁾ | Voltage output: 0 ... 2 VDC Current output: 3.9 ... o_EP - 8 mA |
| End point adjustment analogue output (o_EP) ¹⁾ | Voltage output: o_nP + 4 ... 10.5 VDC Current output: o_nP + 8 ... 20.1 mA |

¹⁾ Available with optional function package, see "Accessories"

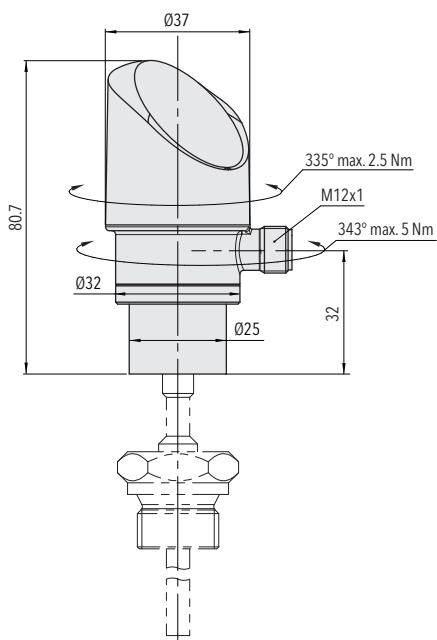
²⁾ T_EP - T_nP ≥ 50 % FS

| Switching output | |
|-------------------------------|--|
| Setting range of switchpoints | 0 ... 100 % FS |
| Switching hysteresis | ≥ 1 % FS |
| | Switchpoint > reset point |
| Switching resistance | ≤ 3 Ω |
| Output function | Hysteresis, Window; normally closed (NO), normally open (NC) |
| Switching current | ≤ 0.5 A each switching output |
| Life time | > 100 x 10 ⁶ cycles |
| Current limiting | ≤ 2 A each switching output |
| Delay time | 0 ... 99.99 s |

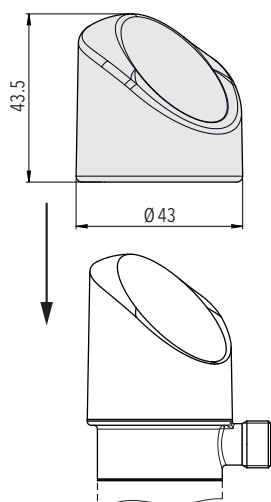
| Display | |
|--|--|
| Display | 4-digit 7-segment display 180° flippable with disable function decimal place: 1 |
| Switching status indication | 2 LED, red |
| Operation | With 3 buttons and menu navigation according to VDMA 24574-1 |
| Display resolution | 0.1 K |
| Display range | -3 ... 103 % FS |
| Setting parameters | See table Parameters |
| User scale unit; User defined values for display indication zero point and end point ¹⁾ | Display zero point: -999 ... 9999 Display end point: -998 ... 9999 |

¹⁾ Available with optional function package, see "Accessories"

Dimensions

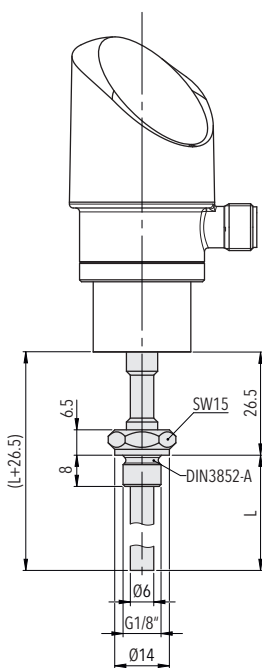


Protective cap

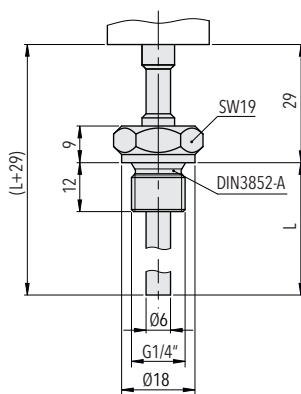


8180.XX.XXXX.35/32.XX.XX

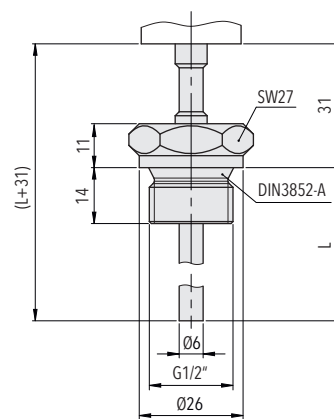
Standard process connection



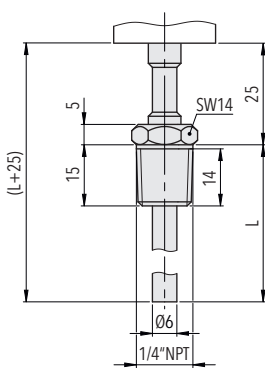
8180.XX.XX11/21/31/41/51.XX.XX.XX



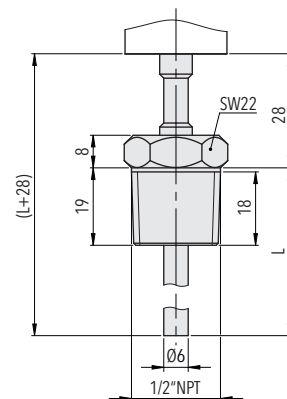
8180.XX.XX12/22/32/42/52.XX...



8180.XX.XX13/23/33/43/53.XX...

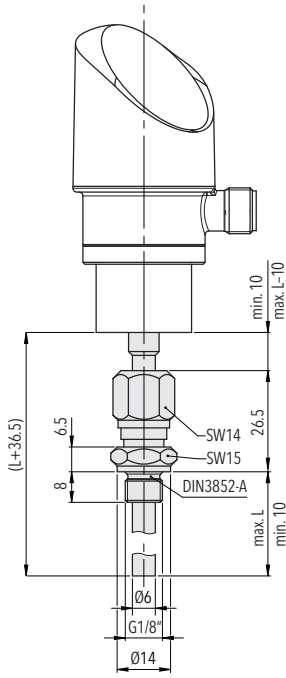


8180.XX.XX1B/2B/3B/4B/5B.XX...

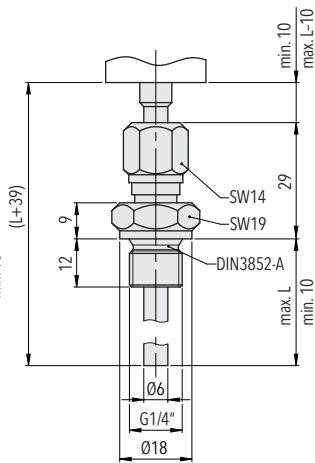


8180.XX.XX1C/2C/3C/4C/5C.XX...

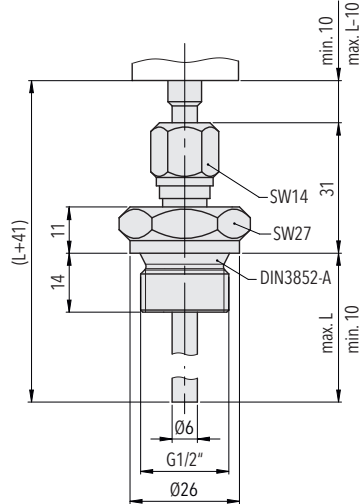
Adjustable process connections



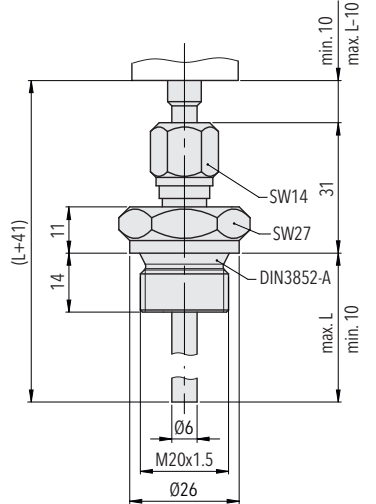
8180.XX.XX14/24/34/44/54.XX.XX.XX



8180.XX.XX15/25/35/45/55.XX...

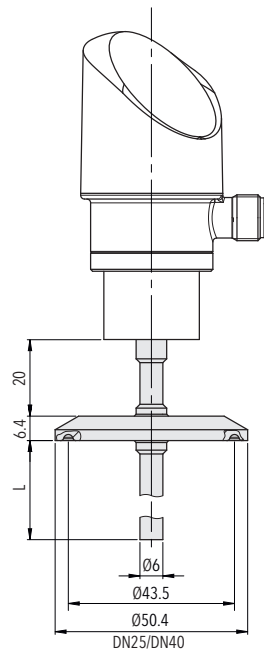


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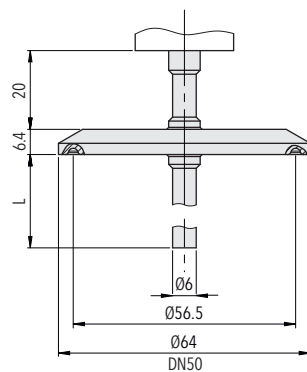


8180.XX.XX.57

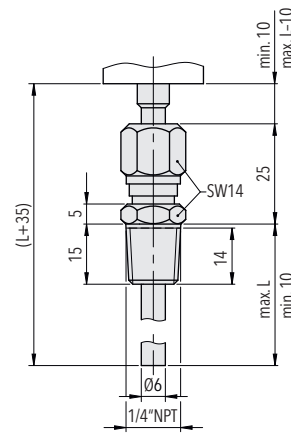
Tri-Clamp Process connections



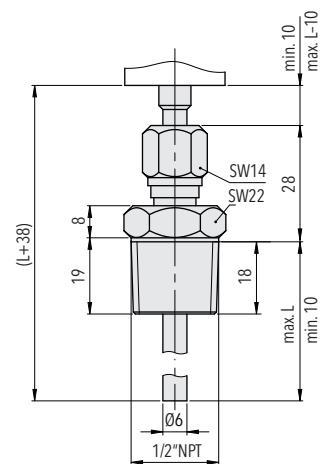
8180.XX.XX1G/2G/3G/4G/5G.XX...



8180.XX.XX1J/2J/3J/4J/5J.XX...

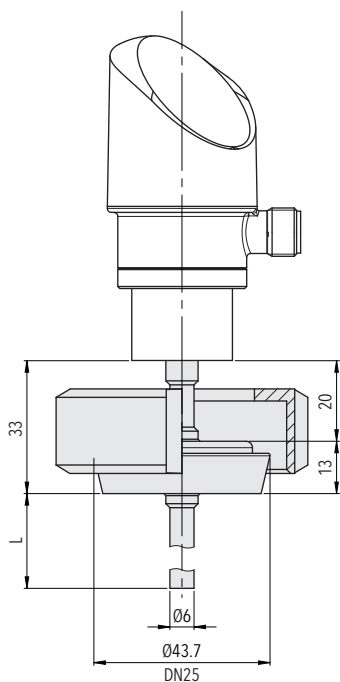


8180.XX.XX1D/2D/3D/4D/5D.XX...

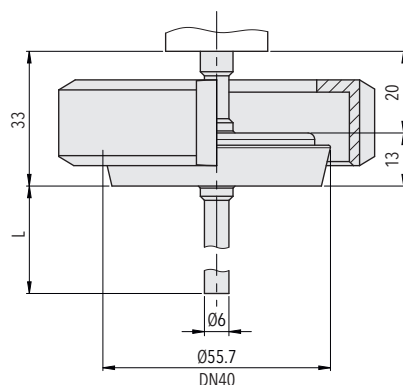


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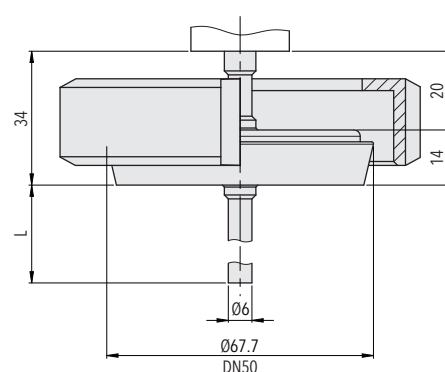
Sanitary fittings



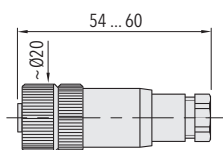
8180.XX.XX1L/2L/3L/4L/5L.XX...



8180.XX.XX1M/2M/3M/4M/5M.XX...

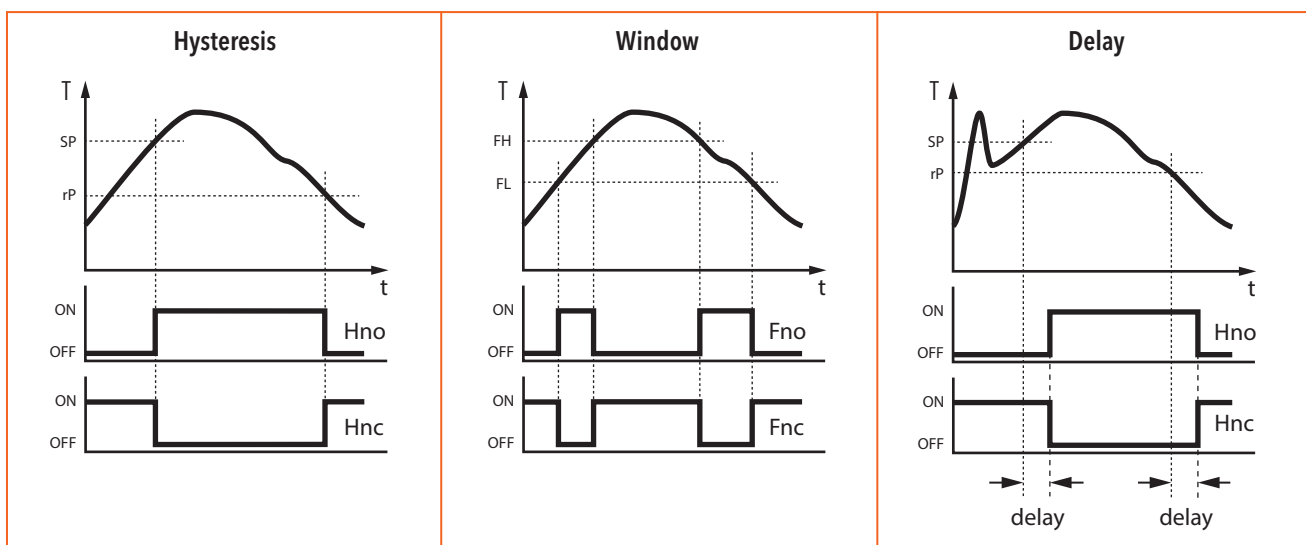


8180.XX.XX1N/2N/3N/4N/5N.XX...



8180.XX.XXXX.XX.XX.33

Functions switching output

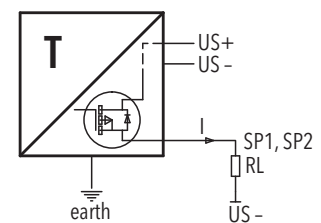
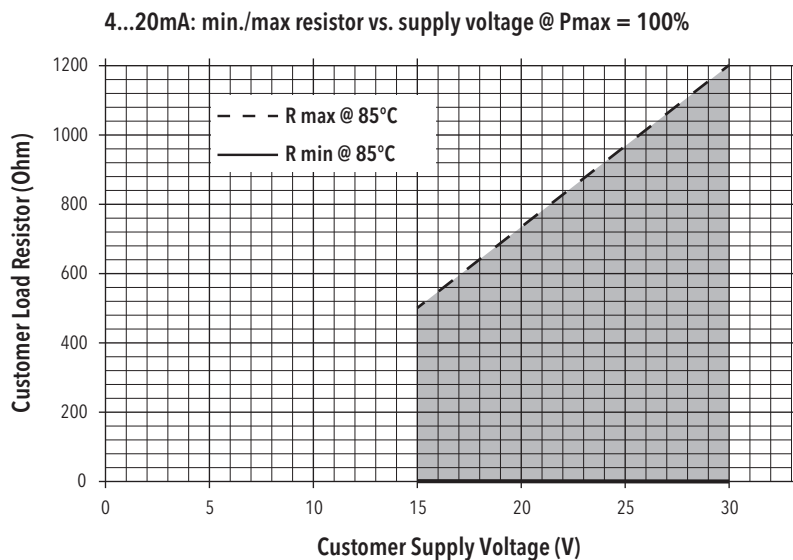


Electrical connection

| | | Protection / electrical connection | | | |
|-------------------|---------------------------------------|--|--|-------------------------------------|-----------------------|
| | | IP65*) | | | |
| | | M12x1 | | | |
| | | 5-pole 35 | | 4-pole 32 | |
| | | | | | |
| Output signal | | P1 | P2 | P3 | P4 |
| | PA | ✓ | ✓ | ✓ | |
| | PU | ✓ | ✓ | ✓ | |
| | PV | ✓ | ✓ | ✓ | |
| | PW | ✓ | ✓ | ✓ | |
| | PS | | | | ✓ |
| Pin Configuration | | P1 | P2 | P3 | P4 |
| | 8180.xx.xxxx.xx.PA/PU/PV/PW/PS | 1 3 2 4 5 Shield ***) | 1 3 5 4 2 Shield ***) | 1 3 2 4 Shield ***) | 1 3 - 4 2 |

*) Provided female connector is mounted according to instructions

***) The use of a shielded cable is recommended



Connection of loads to switching output

Additional information

Documents

| | |
|--------------|--|
| Data sheet | www.trafag.com/H72352 |
| Instructions | www.trafag.com/H73352 |
| Flyer | www.trafag.com/H70605 |